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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,308

Applicant(s)

ARAI, YASUYUKI

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(d).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1448) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Interpretations

1. The term "small molecule" is understood in the art of organic electroluminescence (EL) devices to refer to non-polymeric organic materials, such as Alq₃ (See, e.g., Gu et al. (U.S. Patent 5,844,363) col. 1, line 64-col. 2, line 6).
2. The term "goggle-type display" in claims 9-12 is interpreted in light of p. 20, lines 11-12 as inclusive of any head-mounted display. See also Fig. 7D.
3. The phrase "at an atmospheric pressure" in claims 17-20 has been interpreted in light of the specification (e.g., p. 6, lines 9-10) as requiring a pressure of approximately 1 atmosphere (1.01×10^5 Pa).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 23 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification as originally filed does not provide support for moving the evaporation cell during the heating step.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-8 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis et al. (U.S. Patent 5,902,688, hereafter '688) in view of Onitsuka et al. (U.S. Patent 6,049,167, hereafter '167).

Claim 1: '688 teaches a method of manufacturing a light-emitting device, comprising the steps of:

placing (i.e., filling) an organic electroluminescence (EL) material into a crucible (i.e., an evaporation cell) (col. 9, lines 15-25; Fig. 10); and

heating the organic electroluminescence material to form a light emitting layer (109, 110) on a substrate (103) (col. 5, lines 55-67; col. 6, lines 33-51).

'688 teaches that the evaporation occurs under vacuum conditions (col. 9, lines 15-17), but is silent as to the atmosphere. Therefore, it does not teach that the vacuum atmosphere should be an inert gas. '688 seeks to solve the problem of degradation of the material by oxidation during processing (col. 2, lines 28-49).

'167 also teaches a method of manufacturing organic EL devices and is also concerned with the degradation of the EL layer (In this case by the effects of moisture) (col. 1, lines 10-32). '167 also teaches that the layers may be deposited by vacuum evaporation (col. 12, lines 31-67) and teaches that the EL layer forming steps in the presence of an inert gas (Abstract). '167 does not explicitly teach that the evaporation source is an organic EL material filled into a cell.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have performed the vacuum deposition of '688 in the inert gas of '167 because '167 teaches that organic EL layers may be deposited by vacuum evaporation in inert gas, and further because '167 suggests that the use of inert gas avoids degradation that would have been experienced using moisture-containing atmospheres.

Claims 2 and 4: '688 teaches that the evaporation cell containing the EL material(s) are placed in a reaction chamber (163), with (a) shutter(s) (173) over the source of the evaporation cell(s) (col. 9, lines 15-37; Fig. 10).

'688 teaches opening and closing the shutter to form a light emitting layer on the substrate comprising the organic EL material (col. 9, lines 30-37).

Claims 3 and 4: '688 teaches that the shutters are opened and closed to perform "selective deposition" of the materials, including the EL material (col. 9, lines 30-33).

Claims 5-8: '688 teaches that more than one evaporation cell may be provided (Fig. 10; col. 9, lines 15-37).

Claims 13-16: The organic EL materials may include Alq_3 , a small molecule material (See Spec., p. 18, lines 3-6).

8. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Rallison et al. (U.S. Patent 5,945,967, hereafter '967).

'688 and '167 are discussed above. '688 teaches the use of EL devices to display photographic images (col. 2, lines 55-56), but it does not explicitly teach their use for video or digital camera displays.

'967 teaches that electroluminescent displays are suitable for forming video camera displays (col. 1, lines 13-30). The selection of a known material based on its suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the EL device produced by the method of '688 and '167 as a video camera display with a reasonable expectation of success because '967 recognized the suitability of EL devices for video camera displays.

9. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Wadley et al. (U.S. Patent 5,534,314, hereafter '314).

'688 and '167 are discussed above. They teach that the evaporation takes place under vacuum conditions (i.e., below atmospheric pressure). They do not teach that the evaporation takes place at atmospheric pressure. Vacuum evaporation, as described by '688 and '167, is a physical vapor deposition (PVD) technique.

Wadley '314 teaches an evaporation method in which a crucible (i.e., an evaporation cell) is filled with an evaporation source and directed to the deposition substrate in the presence of an inert gas at up to atmospheric pressure (col. 5, lines 50-64, col. 11, lines 8-12). The electron beam treatment heats the evaporation material (col. 12, lines 42-49). Wadley '314 teaches that the technique offers better efficiency, less expensive equipment, and faster deposition rates than

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PVD, while avoiding the use of high vacuum (col. 1, lines 30-67; col. 4, lines 14-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the deposition method of '314 in place of the PVD methods of '688 and '167 in have received the benefits of higher efficiency, lower cost, faster deposition rate, and lower vacuum requirements.

Claims 18-20: Wadley '314 is open to the use of other evaporant sources (col. 15, lines 15-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided multiple shuttered sources as taught by Antoniadis '688 in order to have provided the separate layers of the EL device (as discussed above).

10. Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Peng (U.S. Patent 6,495,198, hereafter '198).

'688 and '167 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another.

'198 teaches that moving the substrate and organic electroluminescent sources relative to one another in order to form blurred junctions and thereby improve the conductivity between layers (col. 3, lines 31-61; col. 5, lines 25-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have move the substrate and the depositional source relative to one another in order to have improved the conductivity between layers of the EL device of '688 by blurring the junction between the layers.

Claims 23-24: The evaporation cell may be moved during the deposition step (col. 4, lines 25-46).

11. Claims 21-22 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Swanson (U.S. Patent 6,537,607, hereafter '607).

'688 and '167 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another.

'607 teaches that moving the substrate and organic electroluminescent sources relative to one another in order to striped areas of different colors (col. 5, lines 4-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have move the substrate and the depositional source relative to one another in order to have provided colored stripes in the device of '688.

Claims 31-33: The strips may be 500 (i.e., several hundred)-1000 microns wide (col. 5, lines 30-38). The port must have a diameter equal to or more than smaller than the strip width because diffusion of the materials will make the material expand after emission. Furthermore, the size of the port affects the pressure inside the cell. It has been held the discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the diameter of deposition cell in order to have optimized the pressure within the effusion cell.

12. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 and Swanson '607 as applied to claims 21-22 above, and further in view of Nanto et al. (U.S. Patent 5,921,836, hereafter '836).

'688, '167, and '607 are discussed above. They do not explicitly teach moving the evaporation source. However, the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '836 teaches that phosphor stripes may be applied to display panels by moving the deposition sources (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have moved the cell instead of the substrate of '688 and '607 with a reasonable expectation of success and with the expectation of similar results because '836 teaches that moving the deposition source is a suitable method of applying stripes to a substrate.

13. Claims 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Onitsuka '167 as applied to claims 1-4 above, and further in view of Eguchi et al. (U.S. Patent 4,672,265, hereafter '265).

'688 and '167 are discussed above. They do not explicitly teach that the evaporation cell is made of tungsten. However, The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '265 teaches that tungsten is an operative material for evaporation boats for electroluminescent materials (col. 11, lines 45-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used tungsten as the particular boat material of '2'688 with a reasonable expectation of success because '265 teaches that it is an operative boat material.

Response to Arguments

14. Applicant's arguments filed 10/20/2003 have been fully considered but they are not persuasive.

Applicant argues that Onitsuka does not teach forming an EL layers in the presence of an inert gas because the first sentence of the Abstract does not teach forming EL layers in the presence of an inert gas. The argument is unconvincing because the final sentence of the Abstract does: "The steps of forming layers on substrates to form organic EL multilayer structures...are carried out in inert gas atmospheres."

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 8-5:30 M-F, with alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MBP

MBP

January 8, 2004


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